Commentary

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Animal Welfare and Circular Welfare Economy

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Description

Antimicrobial residues are of great importance in food production because of the potential for negative consequences on human health, such as antimicrobial resistance. A large percentage of these drugs are excreted and persist in animal waste. Therefore, animal waste could be used as a non-invasive matrix for antimicrobial analysis, and a tool to control the use of antimicrobials in animal production.

Animal Welfare Issues

By aiming to produce sufficient food as a basis for long-term human welfare, circular agriculture may be an anthropocentric concept. We need food to survive. Concern over food security can spark social conflict, as can concern over ecosystem degradation. However, while food security in a circular food system seems necessary for our long-term welfare, it is not sufficient. Other welfare needs are also important. We also need to avoid climate change and health issues like obesity, and we need basic freedoms like freedom of expression and moral autonomy. When we succeeded in closing nutrient cycles and in preserving wildlife habitats, we could, therefore, still have major welfare issues, not only in humans, but also in animals. Animal-welfare issues would probably persist in an animal-welfare-exclusive circular agriculture in which farm animals were raised in current farming systems.

For example, the practice of tail docking could continue when it facilitated the closure of nutrient cycles. Pigs with intact tails may need more resources like space, enrichment and health care. Also, the use of inadequate enrichment materials could continue in welfare-exclusive circular agriculture. Balls that look like hockey balls are affordable, they look nice and last long, and farmers may even call them 'sustainable', but such balls have an inferior enrichment value for the pigs. And even if animals in welfare-exclusive circular agriculture had natural lives, their welfare could still be compromised, for example, when they were exposed to predation or harsh weather conditions. Circular agriculture could also generate other societal concerns. Herbivores, for example, have a special role in circular agriculture by converting inedible grass into animal-based food. However, by producing methane, they also contribute to climate change. Thus, circular agriculture addresses crucially important aspects of sustainability and especially human welfare. But its relationship with overall sustainability requires a broader scope and an open mind regarding potential welfare problems.

A new microbiological screening method for the detection of antimicrobials for six classes in manure was developed, implemented, validated, and verified in vivo. Validation was performed by assessing the specificity, stability and ruggedness according. The verification was performed in broiler chickens. Six birds were treated per group, one for each antimicrobial class. Manure samples were analysed by the screening methodology and HPLC-MS/MS, as confirmation. The implemented six plate screening was specific to detect all antimicrobials tested. Determined for macrolides lactams and sulphonamides, for tetracyclines and lincosamides, and for quinolones positive samples were confirmed by HPLC-MS/MS. The applicability of the method was tested on pig manure, in these samples a higher number of false positives were obtained with respect to chicken droppings. In conclusion, this new screening method presented performance characteristics that demonstrate utility for the intended analytical applications, ensuring traceability of the results.

Circular Welfare Economy

The current food system is not sustainable. Circular agriculture aims to save the environment and produce food sustainably by closing nutrient cycles, possibly without improving animal welfare. This paper proposes a new conceptual framework, called a Circular Welfare Economy (CWE), to facilitate a transition towards a sustainable agriculture based on integrity. The CWE framework explains how welfare relates to circular agriculture, how potential conflicts can be solved and what future livestock farming could look like. CWE applies the notion of circularity to welfare defined as the quality of life as perceived by the individual itself. CWE also identifies human integrity, defined as being open and honest, as a sine qua non for sustainability. Animal-welfare problems arise when animals are merely used as a means, for profits. Instead, profits and circular agriculture are means to the end of welfare. In a CWE, welfare is promoted sustainably, without causing undue need frustration in other individuals. This requires informed moral decision-making involving human integrity and the closure of welfare-related feedback loops. Conflicts between circular agriculture and animal welfare are solved by weighing all welfare needs impartially. Three future scenarios are presented: Animal-

welfare-exclusive circular agriculture, which resembles modern intensive livestock farming, animal rights agriculture without livestock farming, and a CWE-based agriculture which integrates circular agriculture and animal welfare. In the latter case, we will not use animals merely as a means to close nutrient cycles, but take every effort, openly and honestly, to understand and benefit their points of view as we do our own.

Stress is a state of disturbed homeostasis evoking a multiplicity of somatic and mental adaptive reactions resulting from any of the 5 freedoms of animals being violated. Many environmental forces disrupt homeostasis in farm animals, such as extreme temperatures, poor nutrition, noise, hunger, and thirst. During stressful situations, neuronal circuits in the limbic system and prefrontal cortex are activated, which lead to the release of adrenalin and noradrenalin. The hormones released during stress are needed for adaptation to acute stress and are regulated by many genes. This review examined molecular regulation, breed differences, and genes involved in stress control in farm animals. Major molecular regulation of stress, such as oxidative, cytosolic heat shock, unfolded protein, and hypoxic responses, were discussed. The responses of various poultry, ruminant, and pig breeds to different stress types were also discussed. Gene expressions and polymorphisms in the neuroendocrine and neurotransmitter pathways were also elucidated. The information obtained from this review will help farmers mitigate stress in farm animals through appropriate breed and gene-assisted selection. Also, information obtained from this review will add to the field of stress genetics since stress is a serious welfare issue in farm animals.